	X	Y
A	neutral	neutral
B	negative	negative
C	negative	positive
D	positive	negative

(1 mark)

3 Extended tier only

What is the correct unit of charge?

A. Ampere

B. Coulomb

C. Newton

D. Volt

(1 mark)

4 Which pair of quantities have the same units?

A. Current and potential difference

B. Current and resistance

C. Electromotive force and potential difference

D. Electromotive force and resistance

(1 mark)

5 Which line correctly states the equation for **electrical energy**?

A. $E = IR$

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B. $E = mv^2$

C. $E = \rho gh$

D. $E = VIt$

(1 mark)

6 A large battery is labelled with various items of information about the battery.

12 V	30 kg	216 kJ	680 A

One of these items of information is the electromotive force (e.m.f.) of the battery.

What is the e.m.f. of the battery?

A. 12 V

B. 30 kg

C. 216 kJ

D. 680 A

(1 mark)

7 Extended Tier Only

Which unit is equivalent to a volt (V)?

A. A/Ω

B. J/C

C. J/s

D. W/C

(1 mark)

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8 Which particles move to cause a current in a copper wire?

A. copper atoms

B. electrons from the copper atoms

C. protons from the copper nuclei

D. neutrons from the copper nuclei

(1 mark)

9 A wire has a uniform circular cross-sectional area.

Which statement is correct?

A. The resistance of the wire is directly proportional to its cross-sectional area and inversely proportional to its diameter.

B. The resistance of the wire is directly proportional to its cross-sectional area and inversely proportional to its length.

C. The resistance of the wire is directly proportional to its length and inversely proportional to its cross-sectional area.

D. The resistance of the wire is directly proportional to its length and inversely proportional to its diameter.

(1 mark)

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Medium Questions

1 A PVC (plastic) rod is rubbed with a nylon cloth. This process causes electrons to be transferred between the rod and the cloth, causing both objects to become charged.

Which row gives the correct nature of the charges on both the cloth and the rod, and the effect the objects have on each other after becoming charged?

	Charges on rod and cloth	Effect
A	the same	repel
B	the same	attract
C	opposite	repel
D	opposite	attract

(1 mark)

2 A student wants to charge up some rods by rubbing them with a cloth made from a suitable material.

He has a number of rods to choose from: a copper rod, a PVC rod, an aluminium rod and a glass rod.

Which two of the rods would hold a charge when rubbed with an appropriate cloth?

A. Aluminium and PVC

B. Glass and copper

C. Aluminium and copper

D. Glass and PVC

(1 mark)

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3 Extended tier only

A student considers how changing the diameter and length of a wire affects its resistance.

Which row shows the changes that could be made to the length and diameter of the wire to **decrease** its resistance?

	Change to length	Change to diameter
A	increase	increase
B	increase	decrease
C	decrease	increase
D	decrease	decrease

(1 mark)

4 A student rubs an acetate rod with a cloth, giving it a negative charge. She then holds it near an earthed, conducting sphere as shown in the diagrams below.

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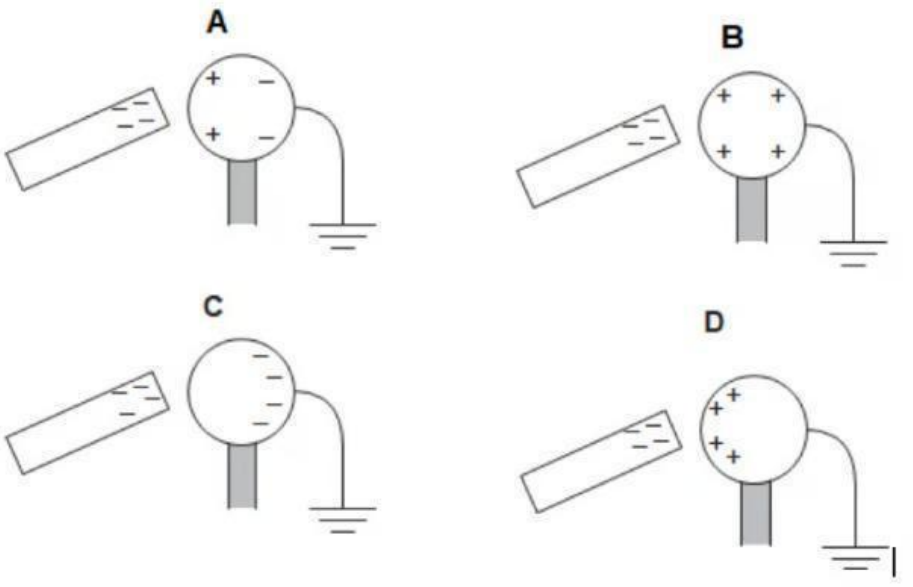
Which diagram shows the correct distribution of charges on the conducting sphere?



(1 mark)

5 Extended tier only

A student has four copper wires, of different dimensions.

Which of the following wires has the largest resistance?

	Length of wire / cm	Diameter of wire / mm
A	100	0.2
B	300	0.1
C	50	0.4
D	30	0.5

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(1 mark)

6 A plastic rod is rubbed with a cloth. The rod becomes positively charged.

What happens to the plastic rod and what is the charge on the cloth?

	plastic rod	charge on cloth
A	gains electrons	negative
B	gains electrons	positive
C	loses electrons	negative
D	loses electrons	positive

(1 mark)

7 The electromotive force (e.m.f.) of a mobile phone battery is 3.7 V.

What does this mean?

A. 3.7 J is the maximum energy the battery can provide in 1.0 s.

B. 3.7 J is the total energy the battery can provide before it has to be recharged.

C. 3.7 J of energy is provided by the battery to drive a charge of 1.0 C around a complete circuit.

D. 3.7 J of energy is provided by the battery to drive a current of 1.0 A around a complete circuit.

(1 mark)

8 A water heater is connected to a 230 V supply and there is a current of 26 A in the heater.

It takes 20 minutes to heat the water to the required temperature.

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How much energy is supplied by the heater?

A. 6.0×10^3 J

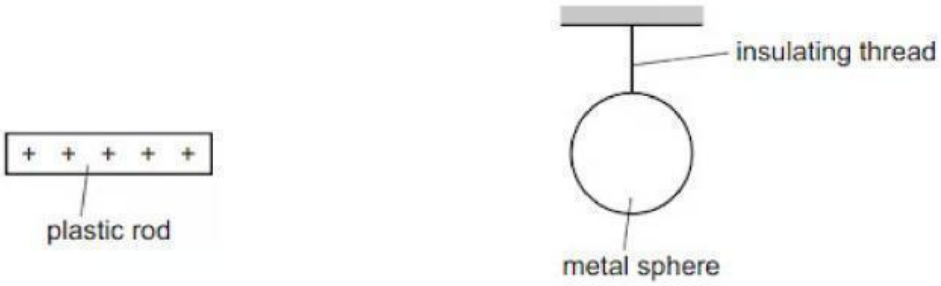
B. 1.0×10^4 J

C. 1.2×10^5 J

D. 7.2×10^6 J

(1 mark)

9 The diagram shows a charged plastic rod and an uncharged metal sphere. The metal sphere is suspended by an insulating thread.



The plastic rod is then moved close to the metal sphere.

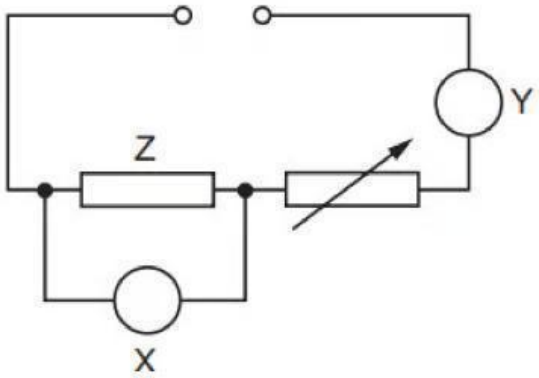
Which row is correct?

	observation	the overall state of the metal sphere
A	The rod attracts the sphere.	charged
B	The rod attracts the sphere.	uncharged
C	The rod repels the sphere.	charged
D	The rod repels the sphere.	uncharged

(1 mark)

LIVEWORKSHEETS

10 The circuit shown is being used to measure the resistance of resistor Z.



What is the correct combination of meters to determine the resistance of resistor Z?

	meter X	**meter Y**
A	ammeter	ammeter
B	ammeter	voltmeter
C	voltmeter	ammeter
D	voltmeter	voltmeter

(1 mark)

LIVEWORKSHEETS

11 A plastic rod is brought near to a small plastic sphere suspended from a stand. The sphere is repelled by the rod.

Why is this?

A. The rod and the sphere have like charges.

B. The rod and the sphere have unlike charges.

C. The rod is charged and the sphere is uncharged.

D. The rod is uncharged and the sphere is charged.

(1 mark)

12 A resistor converts 360 J of energy when there is a current of 3.0 A in it. The potential difference across the resistor is 6.0 V.

For how long is there this current in the resistor?

A. 0.05 s

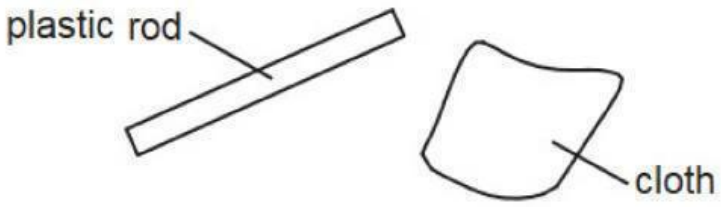
B. 20 s

C. 180 s

D. 720 s

(1 mark)

13 A plastic rod is rubbed with a cloth.



The rod and the cloth both become charged as electrons move between them.

The rod becomes negatively charged.

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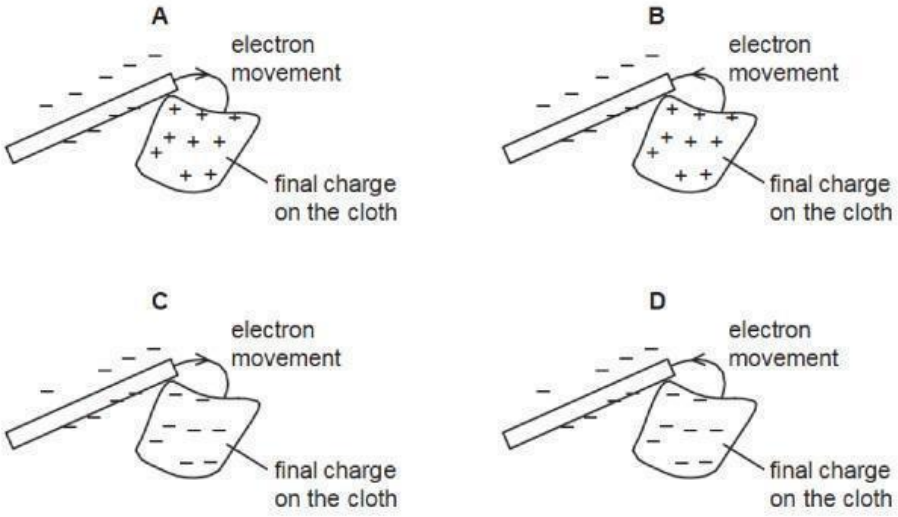
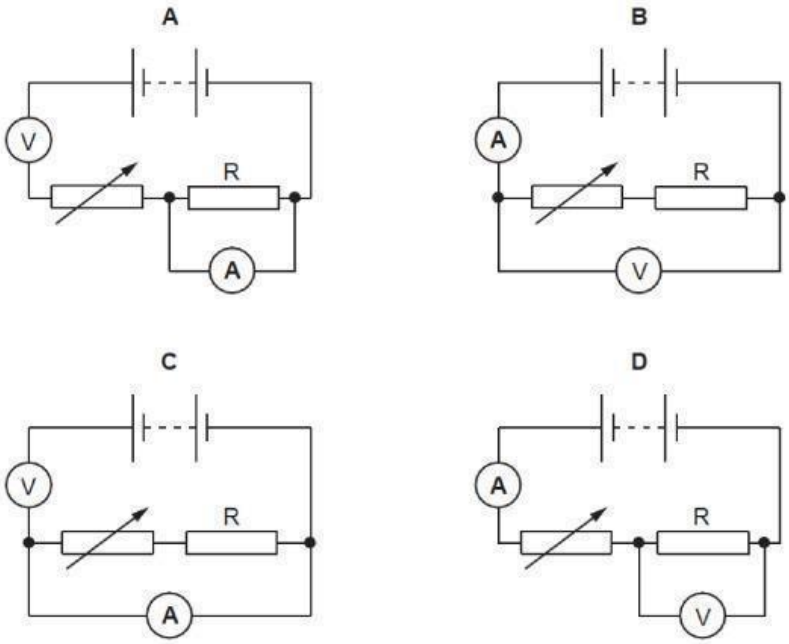
Which diagram shows how the rod becomes negatively charged and shows the final charge on the cloth?



(1 mark)

14 Four students draw a circuit diagram of the apparatus used to measure the resistance of resistor R.

Which circuit is correct?



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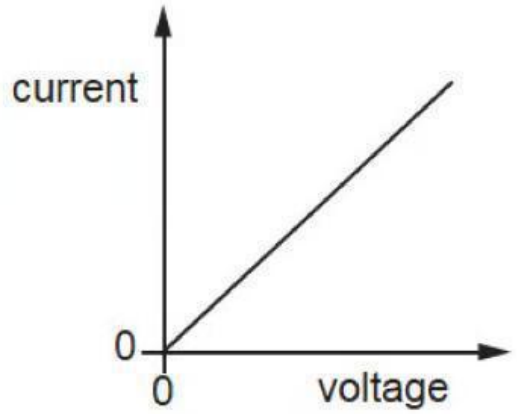
(1 mark)

15 The diagram shows the current–voltage graph for a metal wire.



What can be deduced from the graph?

A. As voltage increases, the temperature of the wire increases.

B. As voltage increases, the temperature of the wire decreases.

C. As voltage increases, the resistance of the wire increases.

D. As voltage increases, the resistance of the wire remains constant.

(1 mark)

16 A battery is connected to a circuit. It is switched on for 1.0 minute.
During that time, there is a current of 0.40 A in the circuit and the battery supplies a total of 48 J of energy.

Which row gives the charge that passes and the electromotive force (e.m.f.) of the battery?

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	charge that passes in 1.0 minute / C	e.m.f. of the battery / V
A	0.40	2.0
B	0.40	120
C	24	2.0
D	24	120

(1 mark)

LIVEWORKSHEETS